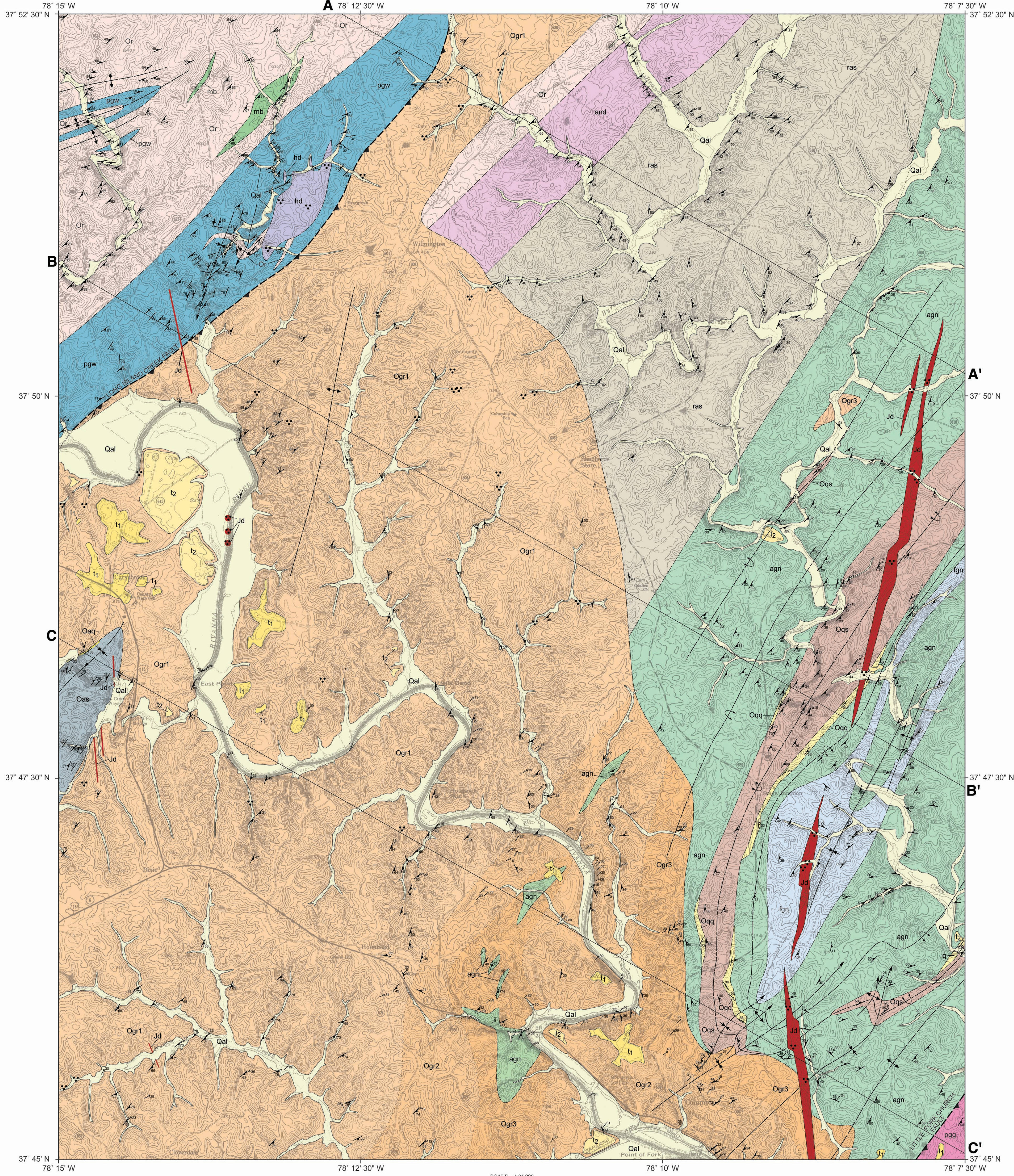


GEOLOGIC MAP OF THE COLUMBIA 7.5 MINUTE QUADRANGLE, VIRGINIA

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EXPLANATION

QUATERNARY

Qal

t₂

t₁

TERTIARY(?)/QUATERNARY

Jd

PALEOZOIC

hd

pgr

ORDOVICIAN

Oas

Oaq

Ogr1

Ogr2

Ogr3

Or

mb

pgw

and

ras

fgn

agn

Surficial deposits

alluvium: Brown to yellow-brown, unconsolidated clay, silt, sand, and gravel deposited in channels and on floodplains of modern stream valleys. 0 to 25 feet (0-8 meters) in thickness. Cross bedding and parallel planar bedding common in sand and silt. Imbrication of vein quartz and quartzite cobbles common in gravel near base of the alluvial deposits. Outcrops of bedrock are common in stream channels.

low terrace deposits: Brown to brown-orange, unconsolidated clay, silt, sand, and gravel underlying flat surfaces 20 to 60 feet (6-18 meters) above modern stream grades. 0 to 50 feet (0-15 meters) in thickness. Gravel occurs at the base of deposits and commonly is in contact with saprolitized bedrock. Best developed along the Rivanna River and Byrd Creek.

high terrace deposits: Brown-orange to dark orange-red, unconsolidated clay, silt, sand, and gravel underlying flat surfaces 90 to 130 feet (27-39 meters) above modern stream grades. 0 to 60 feet (0-18 meters) in thickness. Gravel, vein quartz, and quartzite cobbles in a reddish clayey matrix, are common at the base of deposits. These deposits are in contact with saprolitized bedrock and generally fine upwards. Present along the Rivanna and James Rivers.

Tabular intrusive rocks

diabase: Grayish-black, weathers to brown-orange, fine- to medium-grained massive diabase; composed of plagioclase and augite with ophitic texture, accessory magnetite and rare olivine. Diabase occurs as dikes from 5 to 200 feet (2-70 meters) in thickness that generally strike in a north-northwesterly or north-northeasterly direction and have subvertical contacts; where dikes have not been traced beyond a single outcrop, unit is shown as a colored circle on the map.

Intrusive rocks of uncertain age

hornblende diorite: Greenish gray to dark green, medium-grained to pegmatitic, porphyritic to equigranular, massive to weakly foliated hornblende diorite; composed of 40-55% hornblende, 15-30% plagioclase, 10-15% epidote, 10-15% actinolite, 5-10% calcite, 0-5% quartz and 0-5% biotite, with accessory opaque minerals. Hornblende diorite occurs as an intrusive stock that intrudes phyllitic metagraywacke and metarhyolite. Metamorphosed and weakly deformed at the greenschist facies.

pegmatitic granitic gneiss: Grayish white, weathers to light yellow-brown, coarse-grained to pegmatitic, moderately foliated to coarsely banded granitic gneiss; composed predominantly of K-feldspar megacrysts and quartz with minor muscovite, plagioclase, and biotite. Unit is exposed only to the southeast of the Little Fork Church fault.

Arvonian Formation

graphitic slate: Gray to dark gray, thinly bedded and strongly foliated graphitic slate; composed of 30-60% quartz, 25-40% muscovite, 5-10% albite with minor biotite, graphite, calcite, Fe-oxides, and pyrite. Up to 500 feet (150 meters) exposed in the Columbia quadrangle. Late Ordovician fossil assemblage occurs in this unit 15 km to the southwest.

quartzite (Oaq): Grayish-white to brown, thinly to thickly bedded and moderately foliated quartzite; composed of 80-90% quartz, 5-10% muscovite, 5-10% plagioclase with minor biotite, epidote, tourmaline, calcite, and Fe-oxides.

metaconglomerate (Oaq): Grayish-white to brown, thickly bedded to massive, foliated metaconglomerate; composed of quartz-rich sandy matrix with 0.3 to 4 inch (0.8 to 10 centimeters) clasts of quartz, granite, metagraywacke, and slate. Quartzite and metaconglomerate form a discontinuous unit at the base of the Arvonian Formation, up to 30 feet (9 meters) thick.

Quantico Formation

porphyroblastic schist: Silver to dark gray, strongly foliated porphyroblastic schist; composed predominantly of quartz and muscovite with 0.1 to 0.3 inch (0.3- 1 centimeter) porphyroblasts of biotite, garnet, and rare staurolite, minor Fe-oxides and chlorite after biotite. Foliation crenulated at some locations.

quartzite: Yellow-gray to whitish gray, moderately foliated or compositionally banded quartzite; composed of approximately 90% quartz and minor muscovite, plagioclase, and Fe-oxides.

amphibole/garnet quartzite: Brown to reddish-brown, compositionally banded quartzite; composed of 50-60% quartz, 20-30% amphibole, and 10-40% garnet. Quartzite and amphibole/garnet quartzite form a discontinuous unit at the base of the Quantico Formation, up to 60 feet (27 meters) thick.

Columbia pluton

granodiorite to granite: Gray to light gray, medium- to coarse-grained, equigranular to porphyritic, massive to foliated granodiorite to granite; composed of 20-50% plagioclase, 15-40% quartz, 10-50% K-feldspar, 5-15% biotite and muscovite, and accessory epidote, chlorite, sphene, apatite, zircon, tourmaline, and Fe-oxides. Feldspar phenocrysts up to 1 inch (2.5 centimeters). Feldspars extensively altered to sericite and saussurite near the contact with the Arvonian Formation.

granodioritic gneiss: Gray to black and white, fine- to medium-grained, foliated and/or lineated granodioritic gneiss; composed of 20-50% plagioclase, 15-30% quartz, 10-30% K-feldspar, 10-20% biotite, 0-10% muscovite, and accessory epidote, amphibole, garnet, and Fe-oxides. Completely recrystallized such that no igneous textures are preserved.

amphibole-bearing granodioritic gneiss: Grayish black, fine- to medium-grained, foliated and/or lineated granodioritic gneiss; composed of 20-50% plagioclase, 10-20% quartz, 10-20% amphibole, 10-20% biotite, 5-15% K-feldspar, and accessory epidote, garnet, and Fe-oxides. Rare interlayers of amphibolite. Developed near the borders of the Columbia pluton where it intrudes mafic metavolcanic rocks.

Chopawamsic Formation

metarhyolite: White to tan, fine-grained, weakly to strongly foliated, commonly porphyritic metarhyolite; composed of 60-90% matrix of K-feldspar, quartz, and muscovite with less abundant plagioclase, biotite, and chlorite. Phenocrysts include euhedral to anhedral K-feldspar and quartz.

metabasalt: Green to gray-green, weathers brown, fine-grained, foliated metabasalt; composed of 20-40% albite, 10-30% chlorite, 10-20% actinolite, 5-20% epidote with minor biotite, quartz, and Fe-oxides.

phyllite and metagraywacke: Gray to dark gray and brown, fine- to medium-grained, thinly bedded and foliated phyllite and metagraywacke; composed of 40-60% quartz, 10-30% biotite, 10-25% muscovite with minor albite, calcite, pyrite, and Fe-oxides. Primary sedimentary structures include graded beds and parallel laminations. Interlayered with metarhyolite and intruded by hornblende diorite.

meta-andesite: Dark-green gray, fine-grained, equigranular to porphyritic, foliated meta-andesite; composed of 75-90% matrix of plagioclase, biotite, epidote, chlorite, and quartz with rare relict phenocrysts of plagioclase and hornblende. Amygdulites of calcite are common.

interlayered metarhyolite, meta-andesite, quartz/biotite/muscovite schist, and amphibole schist: Gray to dark gray, fine- to medium-grained, with interlayers of metarhyolite, meta-andesite, and schist. This heterogeneous unit is composed of rocks similar to those in **Or**, **and**, and **agn**. Layers range from approximately 3 to 60 feet (1-18 meters) in thickness.

felsic gneiss: Grayish white, fine- to medium-grained, weakly to strongly foliated felsic gneiss; composed of 20-50% quartz, 10-30% K-feldspar, 10-20% plagioclase, 5-20% muscovite with minor biotite, epidote, garnet, and chlorite. Relict quartz phenocrysts rarely preserved. This unit is interpreted to be felsic volcanic rocks metamorphosed at the amphibolite facies.

amphibolite, amphibole gneiss, and biotite/amphibole gneiss and schist: Blackish gray to dark greenish gray, weakly to strongly foliated amphibolite, gneiss, and schist; composed of 15-35% plagioclase, 10-50% amphibole, ±biotite (up to 20%) with minor quartz, epidote, and garnet. Compositional banding developed at some locations. These rocks are interpreted as intermediate to mafic volcanic rocks metamorphosed at the amphibolite facies.

CONTACTS

Solid where observed or known to within 30 feet (9 meters); dashed where known less precisely than 30 feet (9 meters); dotted where buried beneath surficial deposits.

INTERNAL CONTACTS

Transitional internal contact within the Columbia pluton; contact is gradational and not precisely located.

FAULTS

Solid where observed or known to within 30 feet (9 meters); dashed where known less precisely than 30 feet (9 meters); dotted where buried beneath surficial deposits. Teeth on upper plate of reverse fault or dextral transpressive fault.

MAP-SCALE FOLDS

Trace of F₂ syncline hinge with the direction of plunge.

Trace of F₂ anticline hinge with the direction of plunge.

Trace of F₁ overturned syncline hinge.

Trace of F₁ overturned anticline hinge.

ATTITUDE OF ROCKS

Strike and dip of beds

Strike and dip of vertical beds

Strike and dip of overturned beds

Strike and dip of compositional layering

Massive rock (no penetrative fabric)

Strike and dip of foliation

Strike and dip of vertical foliation

Strike and dip of foliation and trend and plunge of associated lineation (mineral or elongation)

Trend and plunge of penetrative lineation (mineral or elongation) in L-tectonites

Trend and plunge of fold axis

